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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/521,233	07/28/2005	Tetsuhiko Isobe	520514.00022	8670

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EXAMINER	
COLEMAN, WILLIAM D	
ART UNIT	**PAPER NUMBER**
2823	

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04/30/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/521,233	ISOBE ET AL.	
	Examiner	Art Unit	
	W. David Coleman	2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 July 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *07/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

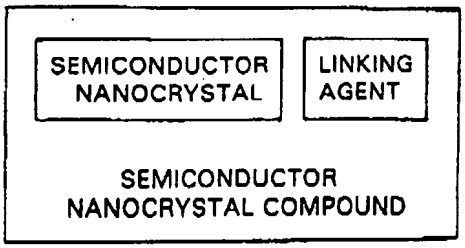
Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-28 are rejected under 35 U.S.C. 102(b) as being anticipated by Weiss et al., U.S. Patent 6,207,392 B1.

3. Weiss discloses a composite nano-particle as claimed. See **FIGS. 1-4**, where Weiss teaches the following limitations.



4. Pertaining to claim 1, Weiss teaches a composite nano-particle comprising a core part of a nano-crystal, a surface-modifying part having a bonding part for bonding the periphery of said core part to the nano-crystal and a substance having an insulating shell part having as a substrate a substance forming a glass state, characterized in that the surface of the periphery of said core part is coated with the surface modifying part having the bonding part for bonding to a bond defect of said nano-crystal and the substance having the insulating shell part having as the substrate the substance forming a glass state (see column 10, lines 30-40).

5. Pertaining to claim 2, Weiss teaches a composite nano-particle composed of three parts comprising a core part of a nano-crystal, a surface-modifying part for coating the surface of said core part to modify the surface, and an insulating shell part the peripheral surface of which is charged by the same charge made up of a substance forming a glass state so as to coat the surface of said surface-modifying part.

6. Pertaining to claim 3, Weiss teaches a composite nano-particle composed of three parts of a nano-sized composite nano-particle comprising a core part of a nano-crystal, a surface-modifying part for coating the surface of said core part to modify the surface, and an insulating shell part so formed as to coat the surface of said surface-modifying part, characterized in that said core part and said surface-modifying part are formed simultaneously by a co-precipitation method in the presence of both a dispersion stabilizing agent and a surface-modifying agent.

7. Pertaining to claim 4, Weiss teaches a composite nano-particle described in claim 3, wherein the surface-modifying agent having the surface-modifying part having a covalent bond part forming a covalent bond with a bond defect of said composite nano-particle is an organometallic compound having SH group, -NH3 group at its terminal and that said insulating shell part comprises a transparent material (see the linking agent table in column 11).

8. Pertaining to claim 5, Weiss teaches a composite nano-particle described in any claim 1, wherein the transparent material made up of the substance forming the glass state constituting

said insulating shell part comprises as a main component a compound selected from the group consisting of SiO, SiO2, SiN, SiON, Si3N4, AI203, and TiO2.

9. Pertaining to claim 6, Weiss teaches a composite nano-particle described in claim 3, wherein said dispersion-stabilizing agent is sodium citrate and said surface-modifying agent is illustrated by the general formula; (R10)(R20)(R30)Si-R4-SH wherein each of R1, R2, R3 and R4 is an alkyl group (see column29, lines 1-35).

10. Pertaining to claim 7, Weiss teaches a composite nano-particle described in any claim 1, wherein said nano-crystal is a phosphor particle selected from the group consisting of ZnS:Mn, ZnS:CI, ZnS:Cu, AI, ZnCdS:Ag, CI, CaS:Eu, CaS:Ce, CaS:Mn, CaS:Cu, CaS:Sb, CaS:Eu, Ce, CaS:Sm, CaS:Pb, CaS:Gd, CaS:Tb, CaS:Dy, CaS:Ho, CaS:Er, CaS;Tm, CaS;Yb, MgS:Eu, MgS:Ce, MgS:Mn, SrS:Eu, SrS:Ce, SrS;Mn, BaS:Eu, BaS:Ce and BaS:Mn (see column 7, lines 37-39).

11. Pertaining to claim 8, Weiss teaches a composite nano-particle described in any claim 1, wherein the surface-modifying layer of the composite nano-particle is carbonized (please note that Weiss uses the term "polymerized" as disclosed in column 11, lines 40-45 and therefore this limitation has been met).

12. Pertaining to claim 9, Weiss teaches a method of preparing a composite nano-particle comprising the steps of: forming, at the same time, a core part of a nano-sized phosphor particle

and a surface-modifying part for coating the surface of said core to modify the surface of said core by a co-precipitation method in the presence of both a dispersion stabilizing agent and a surface-modifying agent; and forming a nano-sized insulating part on the surface of said surface-modifying part.

13. Pertaining to claim 10, Weiss teaches a method of preparing a composite nano-particle comprising the steps of:

forming, at the same time, a core part of a composite nano-particle and a surface-modifying part for coating the surface of said core to modify the surface of said core by a co-precipitation method in the presence of a vitrification-inhibitor for an insulating part comprising as a substrate a substance for forming a glass state and in the presence of both a dispersion stabilizing agent and a surface-modifying agent; and forming a nano-sized insulating part on the surface of said surface-modifying part.

14. Pertaining to claim 11, Weiss teaches a method of preparing a composite nano-particle described in claim 9, wherein the step of forming the composite nano-particle comprises a step of adding as a material for co-precipitating the phosphor an anion material and a cation material, in that order.

15. Pertaining to claim 12, Weiss teaches a method of preparing a composite nano-particle described in claim 9, wherein said dispersion-stabilizing agent is a metallic salt having two carboxyl groups or above.

16. Pertaining to claim 13, Weiss teaches a method of preparing a composite nano-particle described in claim 9, wherein said surface-modifying agent is an organometallic compound having -SH group, -NH3 group at its terminal.

17. Pertaining to claim 14, Weiss teaches a method of preparing a particle described in claim 9, wherein compound is 3-mercaptopropyl trimethoxysilane the chemical formula 1.

(chemical formula 1)

OCH3

I CH30--Si--CH2.CH2.CH2.SH

I

OCH3

18. Pertaining to claim 15, Weiss teaches a method of preparing a composite nano-particle described in claim 9, wherein in the step of forming the nano-sized insulating shell layer on the surface of the core layer of the composite nano-particle, said insulating shell layer is formed of sodium silicate.

19. Pertaining to claim 16, Weiss teaches a method of preparing a composite nano-particle described in claim 9 or--l-0, wherein the composite nano-particle formed by said co-precipitation method is a phosphor particle selected from the group consisting of ZnS:Mn, ZnS:CI, ZnS:Cu, AI, ZnCdS:Ag, CI, CaS:Eu, CaS:Ce, CaS:Mn, CaS:Cu, CaS:Sb, CaS:Eu, Ce, CaS:Sm, CaS:Pb, CaS:Gd, CaS:Tb, CaS:Dy, CaS:Ho, CaS:Er, CaS;Tm, CaS;Yb, MgS:Eu, MgS:Ce, MgS:Mn, SrS:Eu, SrS:Ce, SrS;Mn, BaS:Eu, BaS:Ce and BaS:Mn.

20. Pertaining to claim 17, Weiss teaches a composite nano-particle described in claim 2, wherein the transparent material made up of the substance forming the glass state constituting said insulating shell part comprises as a main component a compound selected from the group consisting of SiO, SiO2, SiN, SiON, Si3N4, AI203, and TiO2.

21. Pertaining to claim 18, Weiss teaches a composite nano-particle described in claim 3, wherein the transparent material made up of the substance forming the glass state constituting said insulating shell part comprises as a main component a compound selected from the group consisting of SiO, SiO2, SiN, SiON, Si3N4, AI203, and TiO2.

22. Pertaining to claim 19, Weiss teaches a composite nano-particle described in claim 2, wherein said nano-crystal is a phosphor particle selected from the group consisting of ZnS:Mn, ZnS:CI, ZnS:Cu, AI, ZnCdS:Ag, CI, CaS:Eu, CaS:Ce, CaS:Mn, CaS:Cu, CaS:Sb, CaS:Eu, Ce, CaS:Sm, CaS:Pb, CaS:Gd, CaS:Tb, CaS:Dy, CaS:Ho, CaS:Er, CaS;Tm, CaS;Yb, MgS:Eu, MgS:Ce, MgS:Mn, SrS:Eu, SrS:Ce, SrS;Mn, BaS:Eu, BaS:Ce and BaS:Mn.

23. Pertaining to claim 20, Weiss teaches a composite nano-particle described in claim 3, wherein said nano-crystal is a phosphor particle selected from the group consisting of ZnS:Mn, ZnS:CI, ZnS:Cu, AI, ZnCdS:Ag, CI, CaS:Eu, CaS:Ce, CaS:Mn, CaS:Cu, CaS:Sb, CaS:Eu, Ce, CaS:Sm, CaS:Pb, CaS:Gd, CaS:Tb, CaS:Dy, CaS:Ho, CaS:Er, Cas;Tm, CaS;Yb, MgS:Eu, MgS:Ce, MgS:Mn, SrS:Eu, SrS:Ce, SrS;Mn, BaS:Eu, BaS:Ce and BaS:Mn.

24. Pertaining to claim 21, Weiss teaches a composite nano-particle described in claim 2, wherein the surface-modifying layer of the composite nano-particle is carbonized (please note that a polymerization process includes carbon).

25. Pertaining 22, Weiss teaches a composite nano-particle described in claim 3, wherein the surface-modifying layer of the composite nano-particle is carbonized.

26. Pertaining to claim 23, Weiss teaches a method of preparing a composite nano-particle described in claim 10, wherein the step of forming the composite nano-particle comprises a step of adding as a material for co-precipitating the phosphor an anion material and a cation material, in that order.

27. Pertaining to claim 24, Weiss teaches a method of preparing a composite nano-particle described in claim 10, wherein said dispersion-stabilizing agent is a metallic salt having two carboxyl groups or above (Weiss teaches a dimethysulfoxide and monosodium salt, column 29, lines 8-24).

28. Pertaining to claim 25, Weiss teaches a method of preparing a composite nano-particle described in claim 10, wherein said surface-modifying agent is an organometallic compound having -SH group, -NH3 group at its terminal.

29. Pertaining to claim 26, Weiss teaches a method of preparing a composite nano-particle described in claim 10, wherein said mercaptopropyl trimethoxysilane formula 1.

(chemical formula 1)

OCH3

I CH30--Si--CH2.CH2.CH2.SH

I

OCH3

organometallic compound is 3-(MPS) illustrated by the chemical.

30. Pertaining to claim 27, Weiss teaches a method of preparing a composite nano-particle described in claim 10, wherein in the step of forming the nano-sized insulating shell layer on the surface of the core layer of the composite nano-particle, said insulating shell layer is formed of sodium silicate.

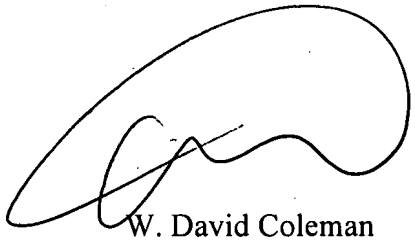
31. Pertaining to claim 28, Weiss teaches a method of preparing a composite nano-particle described in claim 10, wherein the composite nano-particle formed by said co-precipitation method is a phosphor particle selected from the group consisting of ZnS:Mn, ZnS:CI, ZnS:Cu, AI, ZnCdS:Ag, CI, CaS:Eu, CaS:Ce, CaS:Mn, CaS:Cu, CaS:Sb, CaS:Eu, Ce, CaS:Sm, CaS:Pb, CaS:Gd, CaS:Tb, CaS:Dy, CaS:Ho, CaS:Er, CaS;Tm, CaS;Yb, MgS:Eu, MgS:Ce, MgS:Mn, SrS:Eu, SrS:Ce, SrS;Mn, BaS:Eu, BaS:Ce and BaS:Mn

Conclusion

32. Any inquiry concerning this communication or earlier communications from the examiner should be directed to W. David Coleman whose telephone number is 571-272-1856. The examiner can normally be reached on Monday-Friday 9:00 AM - 5:30 PM.

33. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matt Smith can be reached on 571-272-1907. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

34. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



W. David Coleman
Primary Examiner
Art Unit 2823

WDC